

# Science Opportunities at the Homestake Underground Laboratory and Progress on Homestake Proposal

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*for the Homestake Collaboration*

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# traveling today

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- ❑ because of the the snow and wind, which are just up on the 'hill', you might wish to consider adding 20 minutes to your travel time
- ❑ if you are taking the shuttle, Bill will take of this adjustment for you.
- ❑ snow is decreasing in intensity this afternoon



# Outline of Friday and Saturday's Meetings

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- Deep Underground Science and Engineering Laboratory (DUSEL), the National Science Foundation, and Homestake - *Lesko*
- Program Advisory Committee - *Lesko*
- Homestake Infrastructure Requirements, 4850 Laboratory and DUSEL - *DiGennaro*
- South Dakota Science and Technology Authority's Plans and Progress for the Homestake 4850 Laboratory and DUSEL - *Snyder*
- Friday and Saturday: Presentations by Proponents of the Letters of Interest - *all of you*



# Purpose of this Meeting



- First Step in Establishing the Scientific Program for Homestake: especially for the Early Implementation Program

- Who wants to use Homestake?
- What do they need from Homestake?
- When do they need it?

Users  $\Rightarrow$  Homestake

- Discuss the Potential and the Plans for Homestake

Homestake  $\Rightarrow$  Users & PAC

- Program Advisory Committee Independently Reviews Letters of Interest

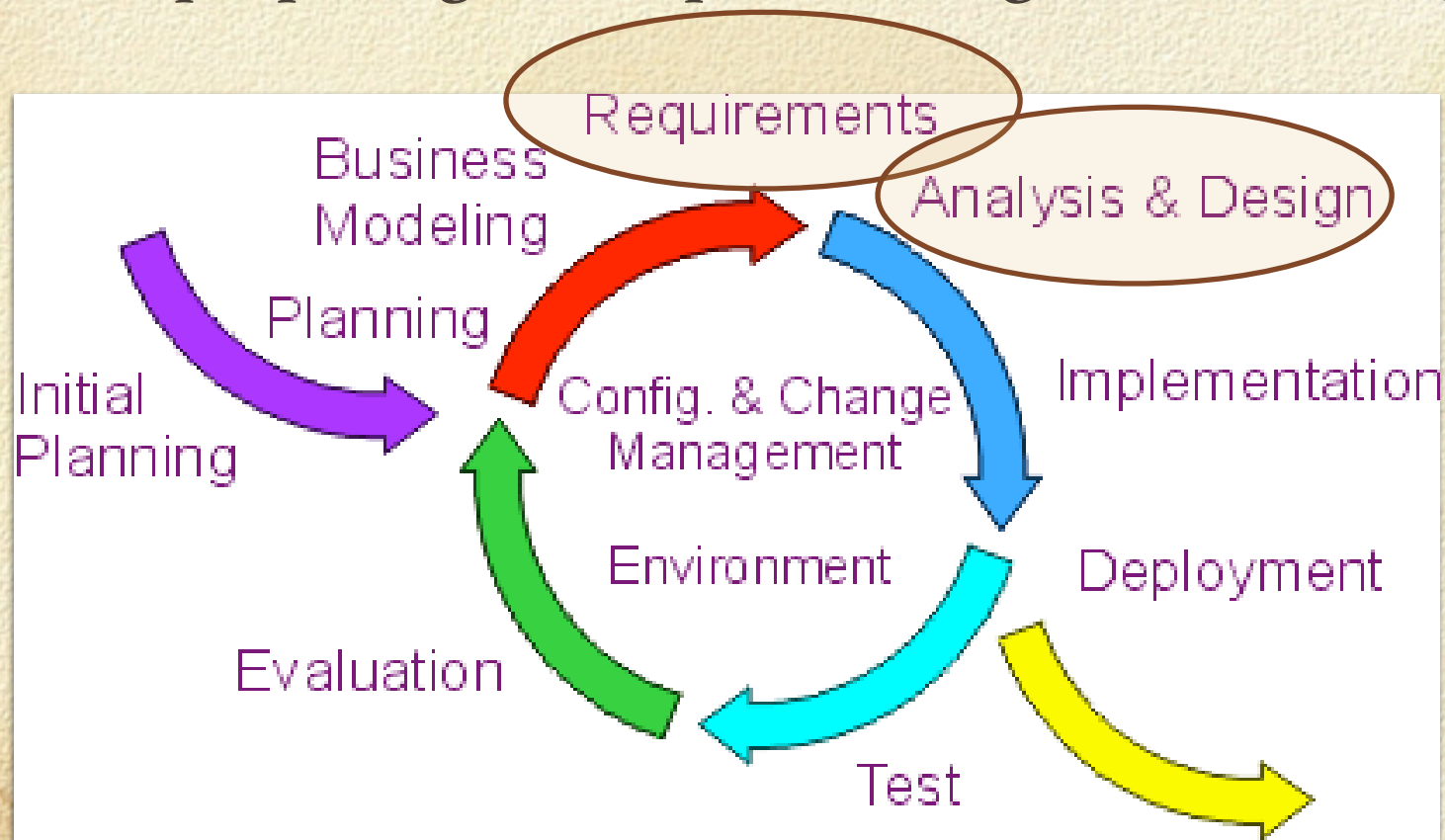
- Establish the Best Match of the facility to the potential users.

Users  $\Rightarrow$  PAC  $\Rightarrow$  Homestake



We are in these phases:

- gathering & understanding requirements
- assembling into models and concepts
- performing initial analysis and design work
- preparing for implementing rehabilitating plan



Expanded Uses in 2008/2009 as DUSEL

Initial Uses in 2007



# NSF Solicitation Process

- S-1 Report due 2006/2007, led by Sadoulet - site independent
- S-2 Scope - 9 months for Report (input from this workshop is essential!) - map science onto the site
- S-2 Scope - Conceptual Design Report (CDR) *including initial suite of experiments*
- Recognition that a complete CDR can NOT be completed within these limits, more complete planning will be accomplished in the Technical Design Review (TDR)
- Proceed with S-3 soon thereafter, by invitation from the NSF, constitutes a TDR, CDR will constitute the S-3 Proposal
- DUSEL Funding via MREFC in 2008 or 2009, *including initial suite experiments (currently working on DOE NSF issues)*



# Homestake: Status and Plans

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- **NSF:** 1 of 2 Finalist for NSF's DUSEL, with Henderson Mine in Colorado - both sites developing CDRs
- **Progress at Homestake:** Significant Progress on a number of important issues, including Title, Indemnification, Rehabilitation **and establishing** a Site for Science on a much shorter time scale
- **Science Opportunities at Homestake in 2007:** The State of South Dakota, working with the science, engineering and education communities has established an "early access" option for Homestake. This is funded from State controlled resources.



# Homestake PIs, Senior Personnel & Coordinators

- ☐ Yuen-dat Chan, LBNL (Other uses)
- ☐ Milind Diwan, BNL (lbl, pdk)
- ☐ Reyco Henning, LBNL (ovdbd, dm)
- ☐ Ken Lande, Penn (lbl, pdk, geo-neutrinos)
- ☐ Bob Lanou, Brown (neutrinos, solar neutrinos)
- ☐ Chris Laughton, FNAL (engineering)
- ☐ Kevin T. Lesko, UCB (physics) PI
- ☐ Stu Loken, LBNL (E+O)
- ☐ Hitoshi Murayama, UCB ( physics theory, neutrinos)
- ☐ Tommy Phelps, ORNL (geomicro)
- ☐ Bill Roggenthen, SDSM&T (geophysics) coPI
- ☐ Ben Sayler, BHSU (E+O)
- ☐ Tom Shutt, Case Western (low backgrounds)
- ☐ Nikolai Tolich, LBNL (geonus)
- ☐ Bruce Vogelaar, Virginia Tech (solar nus)
- ☐ Herb Wang, U Wisc. (geology, rock mechanics)
- ☐ Joe Wang, LBNL (earth science, geophysics)

Richard DiGennaro, LBNL, Project  
Manager and Systems Engineer

Mark Laurenti, Mining Engineer

Syd DeVries, Mining Engineer

Dave Snyder, SDSTA Exec. Director

Trudy Severson, SDSTA

[SDSTA Engineering and Safety  
Personnel](#)

Melissa Barclay & Jeanne Miller



# Homestake Strategies: 4850-lab ➤ DUSEL

- Union of Efforts Working on the Homestake Laboratory
  - Homestake Collaboration Developing the NSF solicitation process responses: S-1, S-2 (CDR), S-3 (TDR), establishing scientific roadmaps and expanding the network of potential users and uses.
  - South Dakota Science and Technology Authority working with South Dakota resources to preserve Homestake for DUSEL and establishing an interim laboratory option



# Input on Laboratory Requirements

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- Earlier Proposals for DUSEL and NUSEL
- DUSEL S-I Process (infrastructure matrices)
- Other facilities (Gran Sasso, Kamioka, SNOLab, Henderson)
- Homestake Letters of Interest
- Letters of Intent and Proposals



# Early Implementation of the Conversion Plan

- ❑ To preserve Homestake for DUSEL needed to address water, title, access. *State Funded Plan*
- ❑ Plan was established and vetted 2004. It is designed to:
  - ❑ obtain title to the facility
  - ❑ regain access to the facility and to the underground
  - ❑ deal with the water
  - ❑ refurbish lifts and shafts
  - ❑ establish an interim facility at 4850 and above *start science early!*
  - ❑ establish a path for growth into a national facility



# Conceptual Design Report and Early Implementation Program Time Table

- Sept. 05      Administrative Set up
- Oct. 05      Site work, Implementation plan, PM, WBS, Design Plan
- Nov. 05      Prepare for Workshops and LOIs
- Dec. 05      Earth Science Workshops associated with AGU
- Jan. 06      Initial LOIs Due
- Feb. 06      Physics and E&O Workshops, Program Advisory Committee Meeting
- April 06      Final Input to CDR
- June 06      CDR due date
- 2007      Homestake open for experiments
- 2008 - 2009      DUSEL funding from NSF including *initial suite of expts.*



# *Program Advisory Committee*

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- ❑ Purpose is to advise the SDSTA on Science Program for Homestake
- ❑ Charge was to initially consider the Early Implementation Program, but to be aware of longer term aspects and uses
- ❑ PAC will evaluate the Letters of Interest and present a recommendation to the SDSTA about the best match between the facility and the set of experiments. Decision will factor in the 5 criteria defined in the Call for Letters of Interest and Homestake “capacity”.



# *Evaluation Criteria*

**1) Science Goals:** what are the scientific, educational, and/or applications motivations for this proposal? What are the goals for the proposal? If appropriate include as much information on experimental *reach* and parameter-space to be covered by the proposal. As appropriate if this proposal is part of the phased approach, what are the subsequent steps and how will the experiment evolve in latter phases?

**2) Infrastructure Requirements and Impact on Other Users:** Using the check lists, estimate the infrastructure requirements of the proposal. You may wish to contact the SDSTA in considering space and access requirements. How will your proposal impact other users? Does it need to be isolated from other users? Will special environmental, safety or health factors need special attention or isolation? What are the plans for decontamination and decommissioning?

**3) Readiness for Deployment - technology:** As appropriate describe the state of required technology. Will additional R&D be necessary to advance the proposal to the deployment phase? What are the plans for this R&D? Describe any risks to the success of the project due to critical technology developments that are required prior to successfully advancing to the deployment phase. Will this R&D be appropriate at Homestake Lab?

**4) Readiness for Deployment - effort and funding:** Describe the collaboration or manpower required to deploy this project. Do formal collaborative agreements exist and is there a functioning management plan/program in place? Are these required for the success of the project? Who are the collaborators on the proposal and what roles do they play and what effort is committed to the program? What is the current status of funding for the proposal? Are proposals or agreements in place with funding agencies? What are the schedules and plans to securing funding?

**5) Environment, Safety and Health:** What are the environmental and safety risks for the project? How will the risks be managed and mitigated? Discussions with Homestake personnel may be warranted to complete this section in completeness.



# *Program Advisory Committee (PAC)*

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- Initially Four Components to the Program (broadly)
  - Earth Science & Engineering
  - Education and Outreach
  - Physics
  - Other uses
- Potentially even broader programs encompassing Homeland Security, industrial research, and additional academic disciplines.



# PAC Membership: January 06

## **Physics**

**Professor Frank Sciulli - Columbia, Co-chair**

Professor Ed Kearns - Boston University

Professor Josh Klein - University Texas

Dr. Bill Marciano - Brookhaven National Laboratory

Professor Harry Nelson - University of California, Santa Barbara

Professor Hank Sobel - University of California, Irvine

## **Earth Science and Engineering**

**Professor Derek Elsworth - Penn State, Co-chair**

Professor Sookie Bang - South Dakota School of Mines and Technology

Mr. Derric Iles - South Dakota Geological Survey, State Geologist

Professor Thomas L. Kieft - New Mexico Institute of Mining and Technology

Dr. Chris Neuzil - United States Geological Survey

Professor Bill Pariseau -University of Utah

## **Education and Outreach**

Professor Charles Ruch - South Dakota School of Mines and Technology



# *Charge to the PAC*

- 1) With the information provided at this initial meeting and with subsequent discussions we request that the **PAC develop of a scientific program well-suited to the Homestake Early Implementation Program** (EIP). We would appreciate a first draft of the science program by late Spring to assist with the plans to rehabilitate the mine and in time for our CDR submission, June 2006.
- 2) The infrastructure at Homestake may be a limiting factor in hosting all of the proposed experiments and uses. From the Letters of Interest and the February meeting we will learn from the proponents their infrastructure and facility requirements. The EIP will be limited in scope, but we would like to **accommodate as many experimental and educational uses as possible**. This meeting will be the beginning of discussions between the South Dakota Science and Technology Authority, the Homestake PIs and the experiment's proponents concerning the infrastructure requirements. The PAC is requested to consider the infrastructure impact as well as the scientific merit when considering the experiments. Proponents have been requested to address the **five criteria for evaluating** the Letters of Interest.



# *Charge to the PAC, cont.*

- 3) We are simultaneously developing the scientific roadmaps beyond the Early Implementation Program. **We are requesting the PAC to consider and advise us on longer term roadmaps for Homestake.** Several of the LOIs offer staged approaches. These may require going deeper in subsequent phases, expanding efforts, etc. The PAC should take into consideration for the EIP the implications of longer term aspects of the proposals. Again an initial draft of the longer term roadmap by this summer will assist us in planning the rehabilitation of Homestake and would be helpful in our CDR.
- 4) There may arise situations where the PAC members are conflicted due to their involvement with particular LOIs. We suggest that the PAC adopt practices similar to the NSF and other organizations, where the conflicted members recuse themselves from the active discussion and ranking of that particular proposal.
- 5) The SDSTA executive director and the Homestake PI(s) will participate *ex officio* with the PAC to assist in providing information on the facility and on similar issues as appropriate.



# Notes for the LOI Proponents

- ❑ PAC members may contact you during or after this meeting for more detailed information
- ❑ We will assemble the first draft of the EIP science plan by ~ March - April 06
  - ❑ this timetable is set by NSF CDR requirements
  - ❑ it may be helpful to LOI proponents in soliciting funding
- ❑ This plan will require additional discussions between Homestake and the LOI proponents (requirements, design and safety reviews, ...)
- ❑ It is helpful to identify possible shared infrastructure requirements **and to establish collaborations.** It may be important to combine similar proposals. Please consider this opportunity.
- ❑ There will be subsequent calls for LOIs



# Resources and Links

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- ❑ <http://neutrino.lbl.gov/Homestake/LOI>
- ❑ <http://neutrino.lbl.gov/Homestake/FebWS>
- ❑ <http://neutrino.lbl.gov/Homestake>
- ❑ <http://www.dusel.org>
- ❑ <http://homestake.sdsmt.edu/HRB/Refer.htm>

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